

REMARKS

I. Introduction

In response to the pending Office Action, Applicants have cancelled claim 3 and amended claim 1 so as to more clearly recite the subject matter of the present invention. In addition, new claim 6 has been added. Support for new claim 6 can be found on page 10, lines 19-20 of the specification. No new matter has been added.

For the reasons set forth below, Applicants respectfully submit that all pending claims are in condition for allowance.

II. Claim 1, As Amended, Is Patentable Over The Cited Prior Art

As recited by amended claim 1, the present invention relates to a fuel reforming apparatus comprising a reforming unit including a reforming catalyst in which a reforming reaction of a raw material containing hydrogen proceeds by adding water to said raw material; a heater for heating the reforming unit; and *a control unit for controlling the supply of the raw material to the reforming catalyst on the basis of the temperature of the reforming catalyst, and for controlling the supply of an inert gas or water to the reforming catalyst. Importantly, **when the reforming catalyst reaches a predetermined temperature, the control unit stops the supply of the raw material to the reforming catalyst, and allows the inert gas or water to be supplied to the reforming catalyst while the reforming unit is being heated.***

As a result of the foregoing structure, the present invention provides a fuel reforming apparatus that automatically recovers the activity of the reforming catalyst by detecting a decrease in activity of the reforming catalyst due to sulfur poisoning by detecting a rise in temperature, and then (under control of the control unit) stopping the supply of raw material to

the reforming catalyst, and supplying inert gas or water to the reforming catalyst while heating the reforming unit.

As set forth on pages 15-17 of the specification, the present invention provides significant advantages over the cited prior art. Most importantly, the deteriorated reforming catalyst, poisoned with sulfur, does not need to be replaced, as it is continually being recovered. As a result, the time and labor associated with recovering the performance of the fuel reforming apparatus is significantly reduced. Moreover, as the reforming catalyst can be repeatedly recovered, as a result, its useful life is substantially extended.

[Turning to the cited prior art, first it is noted that, at a minimum, Chen fails to disclose or suggest *a control unit for controlling the supply of the raw material to the reforming catalyst on the basis of the temperature of the reforming catalyst.*] Indeed, it does not appear that Chen even discloses conditioning the recovery of the catalyst on the basis of the temperature of the reforming catalyst. Nor does Chen appear to disclose any structure, much less the claimed control unit, which controls the automatic recovery process of the reforming unit of the present invention, based on the temperature of the reforming catalyst.

[The foregoing is effectively admitted in the pending rejection. Specifically, as stated in paragraph 11 of the Office Action, the Examiner states that Chen fails to disclose a thermometer for detecting the temperature of the reforming catalyst.] Thus, it is also clear that Chen must fail to disclose the claimed control unit, whose functionality is triggered by the temperature of the reforming catalyst. → inherent

It is further noted that the amendment to claim 1 was intended in part to address the Examiner's comments set forth in paragraph 11, which stated that the functional language set forth in the wherein clause of claim 1 does not further limit the apparatus and is therefore not considered for the purposes of patentability. As set forth above, claim 1 has been expressly

amended to recite the inclusion of a control unit whose operation is also recited by the amended claim. As such, it is respectfully submitted that the operation of the control unit is an express element of claim 1 and must be considered for purposes of patentability. Any attempt to disregard the language of claim 1 as related to the control unit and the operation thereof would be in clear violation of the rules of claim construction as set by the Federal Circuit. Indeed, as even noted in the M.P.E.P. § 2173.05(g), a functional limitation **must** be evaluated and considered, just like any other limitation of the claim for what it fairly conveys to a person of skill in the art.

Turning to the other references applied against claim 3, namely, USP No. 4,147,660 to Yamauchi, USP No. 5,302,470 to Okada, and EP 0 884 271 to Autenrieth, the Examiner also admits in paragraph 13 of the Office [Action that none of these references disclose the use of a temperature sensor for detecting the temperature of the reforming catalyst.] As such, it is obvious
axiomatic that none of the references disclose or suggest a control unit, which automatically controls the recovery of the reforming catalyst on the basis of the temperature of the reforming catalyst.

Thus, as each and every limitation must be disclosed or suggest by the cited prior art references in order to establish a *prima facie* case of obviousness (*see*, M.P.E.P. § 2143.03), and none of the foregoing references even disclose the use of a temperature sensor for measuring the temperature of the reforming catalyst, much less a control unit which automatically controls the recovery of the reforming catalyst based on the temperature thereof, it is clear that claim 1 and the claims dependent thereon are patentable over the cited prior art references.

Furthermore, it is well known that the fact that the prior art could be modified so as to result in the combination defined by the claims at bar would not have made the modification

obvious unless the prior art suggests the desirability of the modification. *In re Deminski*, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986).

Indeed, recognizing after the fact that such a modification would provide an improvement or advantage, without suggestion thereof by the prior art, rather than dictating a conclusion of obviousness, is an indication of improper application of hindsight considerations. Simplicity and hindsight are not proper criteria for resolving obviousness. *In re Warner*, 379 F.2d 1011, 154, USPQ 173 (CCPA 1967).

It is only Applicants' disclosure that discloses a control unit for controlling the recovery of the reforming catalyst on the basis of the temperature of the reforming catalyst. None of the other cited prior art even appears to measure the temperature of the reforming catalyst, much less a control unit which governs the recovery of the reforming catalyst on the basis of its temperature. Thus, the only motivation of record for the proposed modification of the devices of the prior art to arrive at the claimed invention is found in Applicants' disclosure which, of course, may not properly be relied upon to support the ultimate legal conclusion of obviousness under 35 U.S.C. §103. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 227 1 USPQ2d 1593 (Fed. Cir. 1987).

hindsight

For all of the foregoing reasons, it is respectfully submitted that the pending claims are patentable over the cited prior art of record.

III. Request For Notice Of Allowance

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited.

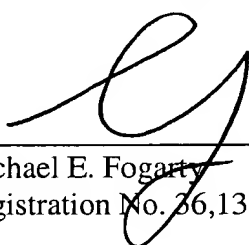
If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

Applicant believes that no extension of time is required. However, this conditional petition is being made to provide for the possibility that Applicant has inadvertently overlooked the need for a petition for extension of time. The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-0417.

Respectfully submitted,

McDERMOTT, WILL & EMERY

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